

The book is written for the general reader who wishes to know, without too much detail, something substantial about the chief things which go to nourish his kind—"the oil to make him a cheerful countenance, and bread to strengthen man's heart." To the English reader, however, there is hardly sufficient novelty, either in the substance of the essays or in their form, to make it worth his while to peruse the book, unless he wishes to give his German an airing.

C. SIMMONDS.

OUR BOOK SHELF.

Studies in Blood Pressure: Physiological and Clinical. Second edition, enlarged. By Dr. George Oliver. Pp. xii+255. (London: H. K. Lewis, 1908.) Price 4s. net.

In this second edition Dr. Oliver has carried the subject of clinical pulse gauging a distinct step forward. Not only has he greatly improved his compressed-air manometer, but he has made further clinical observations on blood pressure, and he presents the subject in a series of generalisations which cannot fail to be of practical value. The alterations he has effected in his instrument concern each of the three portions constituting it—the glass tube, the armlet, and the apparatus for regulating the air pressure in the tube. This latter is now closed at the distal end, thereby doing away with the necessity for a tap, and effectually avoiding leakage. The armlet no longer consists of a gutta-percha bag which completely encircles the limb, but of a canvas bag, constructed to encircle the limb partially, and provided with three straps; this is a great improvement on the older contrivance, admitting, as it does, of ready adjustment to the limb. Finally, instead of regulating the air pressure by a ball-pump, which causes the index to move along the tube in a series of bounds, Dr. Oliver now employs a compressor fashioned concertina-wise, the size of the chamber being controlled by means of a screw passing between the two boards constituting respectively the top and the bottom, an arrangement which enables the air pressure to be regulated with great evenness and nicety.

Dr. Russell recently directed attention to the fact that a thickened, sclerosed artery may vitiate the findings obtained with the armlet method. In this Dr. Oliver agrees. He finds that the readings he obtains with the armlet method may be higher than those yielded by his earlier spring instrument (haemodynamometer). In the slighter degrees of arterial sclerosis the difference in the readings obtained by the two methods is small—from 10 to 20 mm. Hg—but in advanced sclerosis this difference may be much greater, reaching to 40, 50, 70, and even 100 mm. Hg. But, as the author points out, this very difference may be of advantage, affording, as it does, a means of estimating the degree of arterial sclerosis present. He has, moreover, shown that in old people very high armlet readings may be observed in conjunction with low haemodynamometric readings, without any evidence of cardiac strain—the actual blood-pressure, *i.e.*, being low, though a high degree of sclerosis is present. Only when the arterial wall is normal are the readings furnished by the two methods identical.

One of the most interesting parts of the book is that which deals with the causes of excessive arterial blood pressure. The condition is attributed essentially to constriction of the arterioles as the result of chemical irritation, and the sources of the chemical

agents capable of bringing this about are discussed. Dr. Oliver is to be congratulated on the production of these valuable studies.

Dairy Laboratory Guide. By Prof. C. W. Melick. Pp. v+129; illustrated. (London: Archibald Constable and Co., Ltd., 1907.) Price 5s. net.

In some parts of Great Britain, and in most parts of Ireland, dairying is being gradually transferred from the farm to the factory, and an increasing demand for properly trained managers has to be met. Not only must such managers be experienced in the practical operations of butter- and cheese-making, but they must also be able to manipulate the machinery providing power to the dairy, be able to carry out the chemical analysis of milk and cream, possess a knowledge of dairy bacteriology, and be business men. At three of the dairy schools in Great Britain the equipment should be sufficient for providing the course of training required, but no courses specially intended for dairy managers seem yet to be given.

In the State agricultural colleges in the dairying parts of North America, short courses of training for dairy managers are regularly given, and it is for such courses that Prof. Melick has prepared this series of exercises. The book should be useful on this side of the Atlantic by indicating the general lines on which courses can be arranged. In detail, however, the exercises are not entirely suitable for use in this country. The use of the hand churn and butter worker is nowhere referred to, but, though skill in making butter by hand is unnecessary to the creamery manager, the process provides a training which cannot be obtained by more mechanical methods. The three exercises given in hard and soft cheese-making are totally insufficient, and if the plea is offered that there is no time for more, it would surely be better to omit the making of "dried milk cocktail," "buttermilk pop," and a dozen other dietetic delicacies and nostrums which are given as exercises to the students. Again, the economics of dairying should be dealt with far more thoroughly, and the bacteriological exercises should be extended beyond the bacteriology of impurities in milk to the bacteriology of the ripening of cheese and cream.

Nor on literary grounds can the book be recommended in this country as a students' text-book. Partly owing to numerous "printer's" errors, partly to clumsy phraseology, and partly to the use of American technicalities, the meanings of which are unknown to us, portions of the book become almost unintelligible. For example, the student is directed to "make nutrose by boiling together in any alkaline solution dried casein and caustic acid," and again to "make eulactol by dissolving proteic vegetable substance and adding hydrates of carbon, salts, such as phosphate of calcium, cooking salt, or carbonate of sodium, and allow to vaporize" (pp. 107-8). On the other hand, Gray's method for the determination of moisture in butter is admirably described.

Discoveries in Hebrew, Gaelic, Gothic, Anglo-Saxon, Latin, Basque, and other Caucasic Languages, showing Fundamental Kinship of the Aryan Tongues and of Basque with the Semitic Tongues. By Dr. A. E. Drake. (Denver: The Herrick Book and Stationery Company; London: Kegan Paul, Trench, Trübner and Co., Ltd., 1907.) Price 25s. net.

Just as in the sphere of the natural sciences men from time to time arise who believe that they have discovered perpetual motion, or that the circle can be squared, or that one can demonstrate that the earth is flat, so, too, in comparative philology writers are

still occasionally found who, in defiance of all the rigidly scientific investigations of Brugmann, Ostendorff, Henry, Sweet, Murray, and other philologists, persist, by disregarding phonetic and other ascertained linguistic principles, in connecting together utterly dissimilar tongues, such as the Indo-European languages, Hebrew, and Basque. The author of the above-named work is a writer of this type. His work bristles with philological impossibilities, and he appears to have no conception of the necessity of ascertaining, before comparison of one language with another, the laws which govern the sound changes of the languages compared and of the immediate groups to which they belong. The Hebrew word Satan he thinks is cognate with the Basque *Tusuria* "by transposition," and the work abounds in similar equations. The volume is unworthy of serious attention, and its only interest arises from its being one of those strange works that spring from the union of a certain kind of learned industry with misdirected ingenuity.

LETTERS TO THE EDITOR.

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Fellowship of the Royal Society.

It is well known that under existing regulations the number of new fellows elected to the Royal Society every year is only fifteen. In this way the total number of fellows is kept at about 450. In the early days when this arrangement was made the limited annual number was doubtless sufficient to ensure the election of all the scientific men who really merited the honour, but since those days the scientific world has been growing larger and larger, and at the same time the general standard of work in all branches has become higher.

So long as the annual number of candidates was not more than forty or forty-five the selection of fifteen was not very difficult, and no man who had really done good work had to wait more than two or three years before election. Now, however, the annual number of candidates has increased to eighty or ninety, and this year it is said there were nearly 100 candidates.

Is it not high time, then, that the Royal Society took definite steps to make some change which would meet the requirements of the changed circumstances? Many of the older members of the society are well aware that the present state of affairs is unsatisfactory, and some have expressed their sentiments, but nothing has yet been done.

A simple plan would, of course, be to elect thirty new fellows every year instead of fifteen, but one can see objections to this plan. Has it ever been suggested that the Society should create an associateship and elect associates as well as fellows? The number of fellows might remain as it is, but if a limited body of associates was created, say fifty to begin with, and was increased by the election of twelve or fifteen every year, the pressure would be relieved, and I should think A.R.S. would be preferable to a long-deferred F.R.S. Subsequent elections of fellows could then be made from the associates, and this double election would give better assurance than now exists that none but the best men of the year were admitted to the fellowship.

ENQUIRER.

Earthquakes and Earthshakes.

SOME of the memoirs, professedly seismological, which have appeared during the last year or two indicate that confusion has arisen from the use of the word *earthquake* in two distinct and independent senses. As this confusion seems likely to increase unless a modification of our nomenclature is adopted, the introduction of a new term appears to be requisite, however much this may be deprecated on other grounds.

In the generality of cases, the phenomenon represented by the word *earthquake* consists of a vibratory motion of the ground, of the nature of a wave motion, propagated outwards from a more or less extensive origin or focus. In some cases this disturbance may lead to damage or destruction of buildings, or even to displacement of the surface layers of the earth; but these are secondary results of the molecular displacements involved in the propagation of the wave motion, and, apart from them, the earth, after the earthquake has passed, resumes the same position and condition as before.

Occasionally, however, the word is applied to a disturbance of a wholly different kind, resulting in the formation of fractures and displacements of the solid rock, displacements which are molar and permanent, in the sense that the masses affected by them do not return to their original position after the earthquake has passed.

As the first was the sense in which the word is invariably used in Robert Mallet's classical researches, as it is that which has been sanctioned by long-continued usage, and as the proportion of records and observations, which do not apply to this phenomenon, is probably less than one in a thousand, I suggest that the word *earthquake* should continue to be used in this sense, and that for the other sense, in which it is sometimes used, the word *earthshake* should be substituted. Using the words in this way, we may say that earthquakes, or at any rate severe earthquakes, are frequently, if not invariably, caused by rupture of the earth's crust and the formation of fractures or faults in the solid rock, but these fractures, which are the primary cause of the earthquake, are only the secondary result of the earthshake, the action of which arises at a greater depth, and the ultimate cause of which lies beyond our present ken. The distinction is an important one, and the importance may be greater than will be acknowledged immediately, for some recent studies made by me have indicated a possibility that the earthshake has sometimes a greater extent than the earthquake; in other words, that the area over which permanent displacements of the earth's surface have taken place may be greater than the seismic area, or the area over which the shock was felt.

Incidentally, it may be mentioned that the whole of Prof. See's recent publications on the cause of earthquakes, and the greater part of those by Prof. Hobbs, deal with earthshakes and not with earthquakes as here defined. This is natural, for only the permanent changes, resulting from the earthshake, are of importance to the cosmogonist or the geologist: the transient displacements produced by the earthquake concern them, directly, but little, if at all.

R. D. OLDHAM.

Classification and Mathematics.

If mathematics is to be regarded as the science of classification, a view apparently taken in many recent works, it may be worth while to consider whether mathematical teaching should not begin with the use of models of classifications in general rather than with the special classifications in connection with which terms like straight line, rotation, product, power, &c., were originally introduced.

By a model of a classification is meant, for example, a set of things which can be classified by one respect as colour, and cross-classified by another as shape. Similarly, models can be made having three or four or more differentiations, in which any two differentiations have the relation of classification and cross-classification. If each differentiation is supposed to be ordered, we have then spaces of two, three, or four dimensions, of which the classified things form the points. By motion of a point in the space is meant its change in those properties which have been used in the classification. Consideration of the meaning of extension, rotation, and right angle shows the possibility of using the motion of extended bodies to construct a classification of the points of a space, even when we are unable to recognise the differentiations themselves of the space. This is the case met with in ordinary geometry.

As the foundation of geometry lies in the idea of ordered classification, so that of algebra lies in the conception of